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(54) **Card apparatus and cashless transaction system**

(57) The present invention provides a card apparatus for executing financial transactions, comprising:

- processor means for executing authorization routines and certain financial transactions, at least including prepaid transactions off-line, and loading transactions on line directly or indirectly with an issuer computer of an issuer company which issues said card apparatus; and
- memory means for storing data into said card apparatus, at least including a first purse memory part for storing a purse value of a fixed amount as agreed upon between the issuer computer and the user of said card apparatus, and a second authorization memory part for storing an encoded authorization number for authorizing a load onto said card when the user has entered his/her personal authorization number.

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fig. 2 a scheme for the loading of the preferred embodiment of fig. 1; and

fig. 3 a diagram of a preferred embodiment of a cash transaction system of the present system, preferably including one or more preferred embodiments of the card apparatus according to the present invention.

A preferred embodiment of a card apparatus according to the present invention, including a prepayment function, will provide value for the card holder to be used for purchases, after the card holder has given permission for such value to the issuer company. Purchase transactions will usually take place off-line and will be controlled by the card issuer company through certain parameters to be set up in an integrated circuit in the card. During a purchase transaction (and load transaction) the terminal will perform the following security checks:

- if the card is listed on any HOT CARD LIST contained in the terminal the transactions is stopped because if a card is on the hot card list it will mean that it is stolen or lost by the holder with which the issuer company had an agreement;
- the terminal will check if the card is authentic. If not, the transaction is stopped; and
- the terminal will check whether the card is expired or certain applications of the financial card are terminated or blocked by the issuer company. If this is the case, the transaction will follow a separate approval process and may or may not be completed.

Like a smart card, known as such, the card apparatus according to the present invention comprises processor means and memory means embedded in the card apparatus, in one or more integrated circuits. The risk parameters for detecting fraudulent card and fraudulent card use will be effected in a way equivalent to such smart cards. The card apparatus can either be provided with electrical contacts for contact with a vending machine, ATM or other terminal for loading value or redemption of value or with contactless transfer means, e.g. based on electromagnetically coupled interactions or other. The card apparatus functions can also be implemented in existing smart cards such as debit cards or credit cards provided with processor means and memory means.

According to the present invention, value is loaded onto the card apparatus during an on-line dialogue. The value is loaded into one of the purses on the card from the cardholders nominated account. All load transactions will be validated by the cardholder entering his PIN. The PIN will be validated by the card. Load transactions therefore will not be possible at terminals which do not have a PIN keypad or cannot go on-line. There are two ways in which a load can occur. It can be initiated by the cardholder or can be initiated by the card.

The cardholder initiated load always occurs at the location where it is possible to go on-line with an issuer computer or intermediate computer. Such terminals will not be normal POS machines but may for example be combined with existing ATM's or may be specialized machines, e.g. telephones. In case of cardholder initiated loading, the holder of the card apparatus may also be invited to choose the amount to be loaded.

Whenever a card holder attempts a purchase transaction which takes the balance below a certain minimum agreed between the card holder and issuer company, the card will initiate a load sequence. This minimum may be established at the time of issuing the card, and can be zero, but can also be a certain value above zero. The card holder will be required to enter his/her PIN, whereby the loading sequence can only take place at a terminal that is capable of going on-line with a bank computer. As described above, certain security checks will have been performed before going on-line with a bank computer. The card may also force an on-line dialogue with the bank computer for other reasons, such as when the cardholder has made a number of wrong PIN tries off-line and the card can no longer approve of transaction without reference.

The card apparatus according to the present invention is preferably suited for a number of foreign currencies so that the card can be used in different countries. One purse on the card corresponds to one currency. Fig. 1 shows a conceptual structure for 12 purses, for instance Belgium franks, French franks, Dutch guilders, Luxembourg franks, British pounds, Italian liras, Spanish pesetas, Mexican pesos, Canadian dollars, US dollars, Hong Kong dollars, Singapore dollars.

Preferably different thresholds are defined for the card and/or for each purse:

- the load trigger value below or at which a loading is automatically initiated, every time the card is used at an on-line terminal. The load trigger value for each purse may be defined by the issuer company;
- the purchase completion guarantee limit: when the balance on the card is not sufficient to complete a purchase and the purchase transaction terminal is not capable of going on-line or the on-line dialogue has failed, a purchase completion guarantee is preferably made available to allow the card holder to still complete the purchase transaction. The purchase completion guarantee limit may be defined by the issuer company.

Fig. 2 shows the situation where the load trigger value is +100 BeF (Belgian Franks) and the purchase completion guarantee is -150 BeF.

Example:

If the balance on the card is +300 BeF (Belgian Franks) and the purchase amount is 400 BeF, then the purchase can be completed as the amount lacking (100 BeF) is

2. A card apparatus according to claim 1, including two or more purse memory parts for storing two or more purse values for different currencies.
3. A card according to claim 2, provided with means for exchange of value between a first purse value and a second purse value. 5
4. A card apparatus according to claim 1, 2 or 3, provided with means for (partly) unloading a purse value. 10
5. A card apparatus according to anyone of claims 1-4, provided with a load trigger value of zero or above, for triggering a load sequence when such trigger value is reached. 15
6. A card apparatus according to anyone of claims 1-5, provided with a purchase completion guarantee limit under a zero balance for completing a purchase even if the purse value is insufficient. 20
7. A cashless transaction system, comprising:
 - a number of card apparatus for off-line execution of financial cashless transactions; 25
 - one or more terminal apparatuses provided with receiving means for receiving a card apparatus and with a keyboard for off-line executing financial cashless transactions; 30
 - one or more acquirers operatively in connection with one or more terminal apparatuses for acquiring the transaction values obtained by said terminal apparatus;
 - one or more clearers for clearing financial transactions, including transborder transactions and operatively in connection with said acquirer; and 35
 - one or more issuers which issued said financial card on by which issuer a and by which issuer a float account is held, in which float account the prepaid amounts are recorded. 40
8. A cashless transaction system according to claim 7, provided with a card apparatus according to anyone of claims 1-6. 45

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Express purse thresholds:

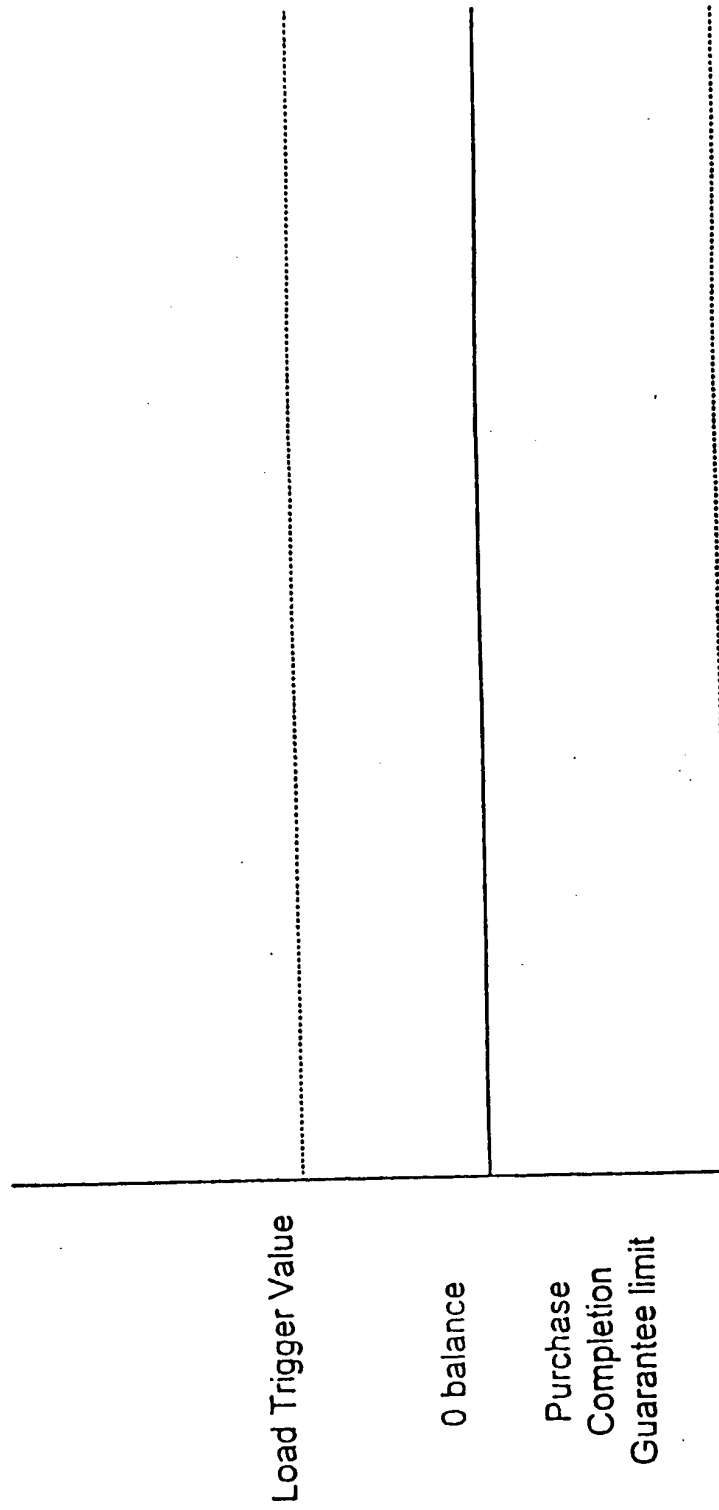


FIG.2



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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 95201458.7
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claims	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	<u>CH - A - 681 573</u> (ASTRAL) * Claims 1(especially f,g), 2; column 8, lines 10-16 * --	1,6,8	G 07 F 7/10 G 07 F 19/00
A	<u>WO - A - 91/13 411</u> (VILLIKARI) * Claims 1,5; page 6, lines 8-30; page 7, lines 33-35; page 8, lines 1-12 * --	2,7	
A,D	<u>WO - A - 91/16 691</u> (JONHIG LIMITED) * Claims 1,3 * --	3,4	
A	<u>WO - A - 94/19 777</u> (MIKROKITOY) * Page 3, lines 4-9 * -----	5	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 6)
			G 07 F 7/00 G 07 F 19/00
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
VIENNA	18-01-1996	BISTRICH	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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